

CLAIMS

What is claimed is:

1. A process for coating a polyunsaturated fatty acid (PUFA)-  
containing carrier particle or a PUFA matrix particle, the process  
5 comprising the steps of:
  - (a) metering a liquid coating material through a flow restrictor;
  - (b) injecting a gas stream through the flow restrictor  
concurrently with step (a) to (i) atomize the liquid coating  
material and (ii) create turbulent flow of the gas stream  
10 and the atomized liquid coating material, wherein the gas  
stream is optionally heated; and
  - (c) adding a PUFA-containing carrier particle or a PUFA  
matrix particle to the turbulent flow region concurrently  
with steps (a) and (b), wherein the PUFA-containing  
15 carrier particle or the PUFA matrix particle mixes with the  
atomized liquid coating material to provide an coated  
PUFA-containing carrier particle or a PUFA matrix particle.
2. A process for coating a liquid pharmaceutical-containing carrier  
particle or a liquid pharmaceutical matrix particle, the process comprising  
20 the steps of:
  - (a) metering a liquid coating material through a flow restrictor;
  - (b) injecting a gas stream through the flow restrictor  
concurrently with step (a) to (i) atomize the liquid coating  
material and (ii) create turbulent flow of the gas stream  
25 and the atomized liquid coating material, wherein the gas  
stream is optionally heated; and
  - (c) adding a liquid pharmaceutical-containing carrier particle  
or a liquid pharmaceutical matrix particle to the turbulent  
flow region concurrently with steps (a) and (b), wherein the  
30 liquid pharmaceutical-containing carrier particle or the  
liquid pharmaceutical matrix particle mixes with the  
atomized liquid coating material to provide an coated  
pharmaceutical-containing carrier particle or a  
pharmaceutical matrix particle.
- 35 3. The process of Claim 1 or 2 wherein the carrier particle is  
selected from the group consisting of a protein, fumed silica, titanium  
dioxide and calcium carbonate, a carbohydrate, a food particle, minerals,  
salts, antioxidants, solid pharmaceutical particles and lipids.

4. The process of Claim 2 wherein the pharmaceutical is selected from the group consisting of nutraceuticals, vitamins, supplements, minerals, enzymes, probiotics, bronchodilators, anabolic steroids, analeptics, analgesics, proteins, peptides, antibodies, vaccines, anesthetics, antacids, antihelmintics, anti-arrhythmics, antibiotics, anticoagulants, anticolonergics, anticonvulsants, antidepressants, antidiabetics, antidiarrheals, anti-emetics, anti-epileptics, antihistamines, antihormones, antihypertensives, anti-inflammatories, antimuscarinics, antimycotics, antineoplastics, anti-obesity drugs, antiprotozoals, antipsychotics, antispasmodics, anti-thrombics, antithyroid drugs, antitussives, antivirals, anxiolytics, astringents, beta-adrenergic receptor blocking drugs, bile acids, bronchospasmolytic drugs, calcium channel blockers, cardiac glycosides, contraceptives, corticosteroids, diagnostics, digestives, diuretics, dopaminergics, electrolytes, emetics, haemostatic drugs, hormones, hormone replacement therapy drugs, hypnotics, hypoglycemic drugs, immunosuppressants, impotence drugs, laxatives, lipid regulators, muscle relaxants, pain relievers, parasympathicolytics, parasympathicomimetics, prostagladins, psychostimulants, sedatives, sex steroids, spasmolytics, sulfonamides, sympathicolytics, sympathicomimetics, sympathomimetics, thyreomimetics, thyreostatic drugs, vasodialators, and xanthines.

5. The process of Claim 1 or 2 wherein the liquid coating material is selected from the group consisting of a natural food color, a synthetic food color, a sugar, a cellulose, a biodegradable polymer, a biodegradable oligomer, an emulsifying wax, a shellac, a flavoring agent, a moisture barrier, a taste-masking agent, an odor-masking agent, hydrophobicity or hydrophilicity agents, a shelf-life extending agent, a lipid, a protein, or a mineral, ethyl cellulose, methyl cellulose, hydroxypropylcellulose, polyvinylpyrrolidone, polyethylene, Aquateric, Eudragit™ (including any commercial grade or formulations), acrylic coatings, Surelease™, bubble gum flavor, cherry flavor, grape flavor, sodium lauryl sulfate, sodium docusate, poly lactic acid, poly lactide glycolic acid, cellulose acetate pthalate, diluents, lactose, microcrystalline cellose, mannitol, dicalcium phosphate, starch, dextrates, sucrose, disintegrants, croscarmellose sodium, sodium starch glycolate, carbohydrate; and as binders: hydroxypropyl cellulose, hydroxypropylmethylcellulose, povidone, methyl cellulose, glidants/lubricants, silicon dioxide, stearic acid, a hydrocolloid, a monosaccharide, a disaccharide, an oligosaccharide, a polysaccharide, a

surface modifying agent, a sugar alcohol, a poly-ol, a flow aid, an interparticle force control agent, magnesium stearate, talc, sodium stearyl fumarate, surfactants, sodium lauryl sulfate, Tween 80, Poloxamer®, hydroxypropyl cellulose, hydroxypropylmethylcellulose, titanium dioxide, colors, polyethylene glycols, triethyl citrate, triacetin, dibutyl sebacate and polymethacrylates.

6. The process of Claim 1 wherein the polyunsaturated fatty acid is selected from the group consisting of  $\gamma$ -linolenic acid (GLA), dihomo- $\gamma$ -linolenic acid, arachidonic acid (ARA), docosahexaenoic acid (DHA) and/or eicosapentaenoic acid (EPA).

7. The process of Claim 1 or 2 further comprising repeating steps (a)-(c) at least once wherein the liquid coating material is the same or different or repeating steps (a)-(c) at least once using a liquid coating material which can be the same or different from the liquid coating material.

8. A coated PUFA-containing carrier particle or coated PUFA matrix particle made by the process of any of Claims 1, 3, 5, 6 or 7.

9. A coated liquid pharmaceutical-containing carrier particle or coated liquid pharmaceutical matrix particle made by the process of any of Claims 2, 3, 4, 5 or 7.

10. A food comprising a coated carrier particle or coated matrix particle made by the process of Claims 1 or 2.

11. A nutritional supplement comprising a coated carrier particle or coated matrix particle made by the process of Claim 1 or 2.

12. A beverage comprising a coated carrier particle or coated matrix particle made by the process of Claims 1 or 2.

13. Infant formula comprising a coated carrier particle or coated matrix particle made by the process of Claims 1 or 2.

14. A pet food comprising a coated carrier particle or coated matrix particle made by the process of Claims 1 or 2.

15. Animal feed comprising a coated carrier particle or coated matrix particle made by the process of Claims 1 or 2.

16. Use of a coated carrier particle or coated matrix particle made by the process of Claims 1 or 2 in producing a product selected from the group consisting of a food, nutritional supplement beverage, pharmaceutical formulation, infant formula, pet food or animal feed.

17. Use of a coated carrier particle or coated matrix particle made by the process of Claim 2 to administer a pharmaceutical to a mammal by

an oral, inhalable, transdermal, parenteral, buccal, nasal, vaginal, rectal, sub-lingual, ocular, periodontal, implantation, or topical delivery route.

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